UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,637	05/27/2005	Josephus Arnoldus Henricus Maria Kahlman	NL021265	2471

24737 7590 02/21/2007

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
JUNG, UNSU	
ART UNIT	PAPER NUMBER
1641	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/536,637	KAHLMAN ET AL.	
	Examiner	Art Unit	
	Unsu Jung	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 November 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 8, 2006 has been entered.

2. Applicants' amendments to claims 1-6 in the reply filed on November 8, 2006 have been acknowledged and entered.

3. Claims 1-8 are pending and under consideration for their merits.

Objections Withdrawn

4. Applicant's arguments, see p5, filed on November 8, 2006, with respect to the objection of the drawings have been fully considered and are persuasive. The objection of the drawings has been withdrawn in light of amended Fig.'s 1 and 10 in the reply filed on November 8, 2006.

Rejections Withdrawn

5. The rejection of claim 7 under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000), and further in view of Hardman et al. (U.S. Patent No. 6,592,820, Filed Nov. 5, 1998) has been withdrawn in view of claim 7 being dependent on claim 3, not claim 3 or 4.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. In claim 1 and all the subsequent dependent claims, the term "a resonance frequency determining sensor element" in lines 5-7 is vague and indefinite. It is unclear whether or not the phrase "a resonance frequency determining sensor element" is referring to "a sensor element" in line 1. Although Applicants clarified that the term "resonance frequency" determining defines the sensor element in the reply filed on June 26, 2006, the currently recited claim remains unclear as the term "a resonance frequency determining sensor element" in lines 5-7 fails to clearly make a reference to

"sensor element" in line 1 to clearly indicate that the "sensor element" in line 1 provides antecedent basis for the later term "resonance frequency determining sensor element" in lines 5-7.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1, 4, 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000).

Oyama et al. teaches a device (quartz crystal microbalance, QCM) comprising a sensor element (having biomolecular binding sites for a biomolecule, see entire document, particularly Abstract and Fig. 1) connected to an external oscillating circuit are adapted to resonate with the frequency inherent in the quartz plates (column 1, line 64-column 2, line 3). This frequency is related to the mass of quartz as well as the mass, viscosity and viscoelasticity of the electrodes, which are in contact with the quartz. Generally, the variation of resonant frequency (f) and that of mass of a substance in contact with quartz are correlated. This device provide for both DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency (column 2, lines 43-57). However, Oyama et al. fails to teach a device comprising a remote power transmission element for receiving a resonant frequency.

With respect to claims 4 and 5, Oyama et al. teaches a sensor element, which forms a part of a voltage (V) or current (I) supplying circuit (oscillating circuit), coupled to the resonance frequency circuit (column 1, line 64-column 2, line 3), wherein the V/I of

the supplying circuit is dependent on the physical property of the sensor element, and the resonant frequency (f) of the resonance circuit is dependent on the V/I (column 6, line 60-column 7, line 19).

With respect to claim 8, Oyama et al. teaches a sensor element formed on the surface of a on-chip SAW resonator can be used for detection of DNA (column 5, line 63-column 6, line 7).

Ruile et al. teaches a radio-interrogated surface wave technology sensor (see entire document, particularly Abstract), wherein a radiofrequency (RF) transmitter and receiver having transmission and reception antennas is used for qualitative/quantitative evaluation of a change in the response of the surface-wave sensor and for receiving power transmitted from a remote RF transmitter (column 2, lines 30-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. with a remote RF transmitter and receiver having transmission and reception antennas as taught by Ruile et al. in order to provide a remote power source and interrogation device for DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency. The advantage of transmitting and receiving detection signals (resonance frequency of the sensor element) remotely provides the motivation to employ the remote power transmission element of Ruile et al. in the device of Oyama et al. with a reasonable expectation of success as the remote power transmission element of Ruile et al. can be used in devices comprising different types of

sensor elements including a SAW resonator, which is used in biosensor applications to identify or quantitatively measure chemical/biological substances.

13. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) as applied to claim 1 above, and further in view of Hirt (U.S. Patent No. 5,926,301, July 20, 1999).

Oyama et al. in view of Ruile et al. teaches a device as discussed above (see item 12). However, Oyama et al. in view of Ruile et al. fails to teach a device, wherein the remote power transmission element comprises a photodiode.

Hirt teaches remote devices, such light emitting diodes and photodiodes, which are usually smaller than radio-frequency antennae (see entire document, particularly column 1, lines 26-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. with a photodiode as a remote power transmission element as taught by Hirt in order to use a remote power transmission element smaller than radio-frequency antennas to be incorporated in the device of Oyama et al. in view of Ruile et al. The advantage of employing remote power transmission element, which is smaller, provides the motivation to combine teachings of Oyama et al. in view of Ruile et al. with a reasonable expectation of success as smaller remote power transmission elements of Hirt would be

advantageous for devices of Oyama et al. having small dimensions (minute size, Example 5).

14. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) as applied to claim 1 above, and further in view of Ishikawa et al. (WO 00/66781, Nov. 9, 2000).

Oyama et al. in view of Ruile et al. teaches a device for detecting biomolecules in samples as discussed above (see item 12). However, Oyama et al. in view of Ruile et al. fails to teach a device, wherein the remote power transmission element in the device comprises a coil for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonant frequency.

Ishikawa et al. teaches a wireless power transmitting element (external control station) for transmitting power to another wireless power transmitting element in a circuit provided in a biosensor device (see entire document, particularly p15, lines 3-17 and Fig. 11). The power is transported either by radiofrequency (RF) radiation or by magnetic coupling between the control system antenna/coil and the biosensor antenna/coil (p15, lines 5-17). Using the RF transmissions, the biosensor can be interrogated individually, or as groups (p14, line 27-p15, line 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the system of Oyama et al. in view of Ruile et al. with

a remote power transmitting element comprising a coil as taught by Ishikawa et al. in order to wirelessly transmit power to a biosensor device to interrogate individual or groups of biosensors. Further, Oyama et al. in view of Ruile et al. meets the limitations of claim 3 except that it employs an antenna (RF radiation) rather than a coil in order to receive an RF frequency different from the resonant frequency. However, because these two elements were art-recognized equivalents at the time of the invention in the remote RF transmission applications where it is immaterial whether an antenna or a coil is used for remote RF transmission, one of ordinary skill would have found it obvious to substitute a coil for the antenna of Oyama et al. in view of Ruile et al. with a reasonable expectation of success.

15. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) as applied to claim 1 above, and further in view of Hardman et al. (U.S. Patent No. 6,592,820, Filed Nov. 5, 1998).

Oyama et al. in view of Ruile et al. teaches a device as discussed above (see item 12). Ruile et al. further teaches that variety of sensor elements (sensitive elements) can be employed with the remote RF transmitter and receiver including magnetoresistors (column 2, lines 56-63). However, Oyama et al. in view of Ruile et al. fails to teach a device, wherein the sensor element (71) is magnetoresistive element provided in a bridge configuration.

Hardman et al. teaches that a conventional biochemical assay may include a detection of microscopic paramagnetic particles (PMPs) bound to a GMR sensor by specific intermolecular recognition bonds (see entire document, particularly column 1, lines 34-37). PMPs are detected as a difference in the resistance of a GMR sensor having a bound PMP compared to a reference GMR sensor having no bound PMP (column 1, lines 37-40). A plurality of sensors is arranged in an array coupled to a differential amplifier (column 2, lines 32-34). Each addressed cell is coupled in a bridge circuit to the differential amplifier, which provides a signal, which is in the form of frequency and conveys indicia of the resistance of each sensor. For proper operation, GMR elements require a current passing through the respective elements (column 17, lines 20-24).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. with a GMR sensor comprising GMR elements coupled to a bridge circuit as taught by Hardman et al. in order to provide GMR sensor with power via wireless power transmitter for conducting biochemical assays using microscopic paramagnetic particles. Further, Oyama et al. in view of Ruile et al. meets the limitations of claim 6 except that it employs an SAW resonator rather than a magnetoresistive element (resistive elements provided in a bridge configuration) in order to detect an analyte in a sample using biochemical/binding assays. However, because these two elements were art-recognized equivalents at the time of the invention in the remote RF transmission applications where it is immaterial whether a SAW resonator or a magnetoresistive

element is used for detecting an analyte in a sample using biochemical/binding assays, one of ordinary skill would have found it obvious to substitute a magnetoresistive element (resistive elements provided in a bridge configuration) for the SAW resonator of Oyama et al. in view of Ruile et al. with a reasonable expectation of success.

16. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) and Ishikawa et al. (WO 00/66781, Nov. 9, 2000) as applied to claim 3 above, and further in view of Hardman et al. (U.S. Patent No. 6,592,820, Filed Nov. 5, 1998).

Oyama et al. in view of Ruile et al. and Ishikawa et al. teaches a device as discussed above (see item 14). Ruile et al. further teaches that variety of sensor elements (sensitive elements) can be employed with the remote RF transmitter and receiver including magnetoresistors (column 2, lines 56-63). However, Oyama et al. in view of Ruile et al. fails to teach a device, wherein the sensor element (71) is magnetoresistive element provided in a bridge configuration.

Hardman et al. teaches that a conventional biochemical assay may include a detection of microscopic paramagnetic particles (PMPs) bound to a GMR sensor by specific intermolecular recognition bonds as discussed above (see item 14).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a GMR sensor comprising GMR elements coupled to a bridge circuit

as taught by Hardman et al. in order to provide GMR sensor with power via wireless power transmitter for conducting biochemical assays using microscopic paramagnetic particles. Further, Oyama et al. in view of Ruile et al. and Ishikawa et al. meets the limitations of claim 7 except that it employs an SAW resonator rather than a magnetoresistive element (resistive elements provided in a bridge configuration) in order to detect an analyte in a sample using biochemical/binding assays. However, because these two elements were art-recognized equivalents at the time of the invention in the remote RF transmission applications where it is immaterial whether a SAW resonator or a magnetoresistive element is used for detecting an analyte in a sample using biochemical/binding assays, one of ordinary skill would have found it obvious to substitute a magnetoresistive element (resistive elements provided in a bridge configuration) for the SAW resonator of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success.

Response to Arguments

17. Applicants' arguments filed on June 26, 2006 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicants' argument that Ruile et al. is drawn to the interrogation of a surface

acoustic wave sensor by determining the terminating impedance and that there is not disclosure of suggestion of the determination of a resonance signal (pp7-8) is not found persuasive in view of previously stated grounds of rejection. As discussed above (see item 12) and in the Office Action dated September 11, 2006, Ruile et al. teaches an RF communication device, which includes a radiofrequency transmitter and receiver having transmission and reception antennas. In the rejection under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. in view of Ruile et al., the RF communication device of Ruile et al. is employed in the device of Oyama et al. in order to remotely provide power to the sensor device of Oyama et al. and remotely receive signals (frequency) generated by the sensor upon binding of a biomolecule. Oyama et al. teaches a device (quartz crystal microbalance, QCM) comprising a sensor element connected to an external oscillating circuit are adapted to resonate with the frequency inherent in the quartz plates (resonant frequency). This frequency is related to the mass of quartz as well as the mass, viscosity and viscoelasticity of the electrodes, which are in contact with the quartz, and the device of Oyama et al. provide for both DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency (column 2, lines 43-57). Upon binding of a biomolecule to the sensor, a change in resonance frequency would be received by the RF communication device of Ruile et al. Therefore, the feature of the resonance frequency of an RF communication device being affected by the sensor is taught by the combined teachings of Oyama et al. and Ruile et al.

With respect to claims 2, 3, 6, and 7, Oyama et al. in view of Ruile et al. teaches all the limitations of independent claim 1 as discussed above. Therefore, the rejections of claims 2, 3, 6, and 7 as stated above (see items 13-16 above) are maintained in view response to arguments in the preceding paragraph.

Since prior art fulfills all the limitations currently recited in the claims, the invention as currently recited would read upon the prior art.

Conclusion

18. No claim is allowed.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Unsu Jung whose telephone number is 571-272-8506. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Unsu Jung, Ph.D.
Patent Examiner
Art Unit 1641

LONG V. LE 02/15/07
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600